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# THESIS

U.S. NAVY IN-HOUSE COST ESTIMATES FOR CITA:  
OPERATIONS OVERHEAD

by

Ronald Paul Holst

June 1980

Thesis Advisor:

R.B. Cunningham

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U. S. Navy In-House Cost Estimates for CITA:  
Operations Overhead

by

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Submitted in partial fulfillment of the  
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

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June 1980



## ABSTRACT

This thesis evaluates the methods for estimating the Operations Overhead portion of the Navy in-house performance of Commercial Industrial Type Activities (CITA), in accordance with the basic requirements of OMB Circular A-76 of March 1979. The application was made primarily for Operations and Maintenance, Navy (O & M, N) funded activities although Navy Industrial Fund (NIF) activities are addressed. The "full cost" concept was reviewed, as it has been used by other nonprofit organizations, by the private sector as it specifically relates to Government contractors using the Cost Accounting Standards Board's criteria, and as required by the OMB Circular A-76. The Navy's accounting systems, as they relate to the collection of expenses for cost estimating purposes were reviewed. It was found that the Navy's Uniform Management Reports (UMRs) did not correlate well to the full cost estimate requirements, however, other standard data sources are recommended. A standard allocation procedure was developed to aid the Government estimator in determining appropriate Operations Overhead costs.





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## I. INTRODUCTION

### A. THESIS PROBLEM STATEMENT

The Office of Management and Budget (OMB) Circular A-76<sup>[1]</sup> Cost Comparison Handbook (hereafter referred to as the Handbook) requires government organizations to estimate their "full costs" to perform in-house functions, when being compared to the cost of contracting those functions. Specific guidelines and examples are provided in the Handbook, to clarify the high degree of detail and completeness required in preparing the estimate of government costs. However, most Navy activities do not normally allocate all overhead costs to individual functions. Some activities establish an applied overhead rate for billing of reimbursable work.<sup>[2/204]</sup> Even Navy Industrial Fund (NIF) activities do not allocate the depreciation of their capital assets. Therefore, although the Navy cost accounting systems are very detailed, they are not "full cost" systems.

As one approach to the implementation of the extensive cost comparison procedure within the Navy, the Naval Facilities Engineering Command (NAVFAC) has sponsored training courses for field activity personnel, to assist field activities in performing their own cost comparisons. Both the course materials<sup>[3]</sup> and the Handbook provide examples, with readily available dollar values to perform the necessary



calculations. How and where to obtain the dollar values from the Navy accounting systems have not been addressed. There are no standards established for the relatively new procedures of selecting source data used in establishing cost pools and the determination of allocation bases.

## B. PURPOSE AND SCOPE

The purpose of this thesis was to bridge an apparent information gap between the existing Navy Cost Accounting Systems and the full cost requirements of the OMB Circular A-76 Cost Comparison Handbook. The foundations of both sides of the gap, i.e., on one side the pertinent reports and data available from Navy field activities, and on the other side, the full cost requirements of the Handbook in accordance with generally accepted accounting principles concerning the allocation of overhead, were investigated in depth. The feasibility of bridging the gap via a standard procedure was evaluated and recommendations proposed. Also, the use of standard Navy source documents was addressed.

This study was limited to the allocation of Operations Overhead costs when developing an estimate of government costs in accordance with the Handbook. The other two classifications of indirect costs, Material Overhead and General Administrative (G & A) expense, were excluded from this analysis. It was assumed the criteria requiring a cost comparison has been met.



Application was made only for Operation and Maintenance, Navy (O & M, N) funded shore activities and their functions currently being performed in-house. The majority of the Navy Industrial Fund (NIF) activity's operations overhead costs are already allocated, and its specific case was not addressed in detail.

### C. EXISTING LITERATURE

The major portion of this thesis relates directly to and amplifies, two primary references: the OMB A-76 Cost Comparison Handbook<sup>[1]</sup> and the Department of Defense's Course book, Management of the DOD Commercial/Industrial Type Activities Program Course, Student Reference Book.<sup>[3]</sup>

Although both of these documents provide a cookbook step-by-step approach to preparing the Government estimate, including examples of how to determine operations overhead costs, an application to the available Navy data is needed. Also, a general review of allocation procedures and allocation standards should prove helpful to the estimator using the Handbook as a guide.

#### 1. OMB A-76

Much has been written on the subject of Commercial/Industrial Type Activities (CITA), since the roots of the program go back to 1955, under the old Bureau of the Budget (now OMB).<sup>[4]</sup> A large percentage of the material addresses the macro aspects of the Government's make or buy decision,





such as implementation of policy changes, and the pros and cons of contracting for government services. Since the latest revision of A-76 (March 1979), little has been written on the subject. At the time of this writing, no audits of completed Navy in-house estimates (under the current criteria) were available from the Navy Audit Agency, Washington, DC.<sup>[5]</sup> The only detailed information on preparing the Government Cost Estimate is in the course material, Reference 3.

## 2. Full Cost

Private industries have long been using the "full" or "total" cost concept or cost accounting as a structure for their planning and control systems and for pricing.<sup>[6:1-5]</sup> Much has been written to assist the profit-seeking manufacturing company in allocating all costs to the end product. Recently, non-profit organizations have become interested, and have adopted the principles of full-cost pricing. In 1971 and 1972, more than thirty lawsuits were filed by commercial laboratories against universities and their affiliated institutes for pricing research services below full cost, which created unfair competition.<sup>[7:164-165]</sup> A strong case has been made for some non-profit organizations to adopt a full cost system for planning and control purposes, as well as for pricing.<sup>[7:122-123]</sup>

## 3. Navy Resources Management System (RMS)

The accounting procedures for the Navy's RMS are well documented by instructions and manuals. There are actually



four major inter-related systems:

- a. programming and budgeting;
- b. management of resources for operating units;
- c. management of inventory and similar assets; and
- c. management of acquisition, use, and disposition of capital assets.

These systems account for all of the Navy's funds and expenditures. Although they represent total costs, the system cannot be considered full cost, since all overhead and indirect costs are not distributed to the final cost objectives or cost centers.

#### D. DEFINITIONS

(NOTE: Appendix A has definition of other pertinent terms.)

Allocate. To assign an item of cost or group of items of cost to one or more cost objectives. This term includes both direct assignment of cost and the reassignment of a share from an indirect cost pool.

Commercial Industrial Type Activity (CITA). A product or service which is required by the Government and that is of a commercial or industrial nature. Examples of commercial and industrial activities are listed in Attachment A of Reference 1.

Full Costs. The total of all direct and indirect costs allocable to a product or service.



In-house. To be with the same organization. Its usage is herein applied to the direct performance of Commercial or Industrial activities by indigenous Government employees using Government assets.

Navy Industrial Fund (NIF). A consolidated working capital fund for industrial-type and commercial type activities. It provides common services within or among the departments and agencies of DOD.

Operations and Maintenance Navy (O & M, N). One of five major congressional appropriation categories, which funds expenses necessary for the operation and maintenance of the Navy. O & MN is herein used as relating to Naval shore activities and the RMS accounting.

#### E. RESEARCH METHODOLOGY

Initially, research for this thesis was directed toward the broad area of the Commercial Industrial Type Activity (CITA) program. In order to identify a CITA related thesis topic which would be practical and of possible use to the Navy, the writer attended a CITA training course at the Western Division Naval Facilities Engineering Command, San Bruno, California, in February 1980.

At that course, Captain David Devicq of the Naval Facilities Engineering Command, Washington, presented an overview of the CITA program. During an interview, Captain Devicq pointed out the problem of integrating the Navy's



accounting system with the full cost requirements of the Cost Comparison Handbook.

The literature search was then focused on the technical aspects of cost accounting and cost allocation procedures, as they were performed in private industry. Also, the Defense Logistics Studies Information Exchange (DELSIE) provided information and literature originating within DOD concerning the Navy's Accounting system, as well as the CITA program.

Several telephone calls to headquarters of organizations, such as NAVFACENGCOM, Naval Audit Agency, DOD Accounting Office, and the OMB Office of Federal Procurement provided general direction and amplification of the intent of the CITA program. Since, at the time of this writing, no current completed Government cost estimates were available, no survey of Naval installations was made.

The illustration used to illustrate the thesis findings was the NPGS Public Works Department Transportation Division. Only procedures have been illustrated. Cost data and numerical calculations were not used because they would duplicate much of the material in the Handbook and course materials.

#### F. THESIS ORGANIZATION

The first chapter introduces the problem addressed by this thesis. It generally discusses what others have written





on related subjects, as well as the thesis approach.

The second chapter discusses why and how the full cost concept is used for Government in-house cost estimates. It compares full cost methods employed by the private sector, by the Government contractors as required by the Cost Accounting Standards Board, by other nonprofit organizations, and by the Handbook. The chapter relates the Handbook's full cost requirements for Operations Overhead to the available Navy accounting information.

Chapter three evaluates the content and quality of the relevant accounting data available from the Navy's Resource Management System (RMS). Specific documents evaluated are the Uniform Management Report (UMR) and the Plant Property Records.

The fourth chapter discusses the allocation process for Operations Overhead expenses. A step-by-step method of allocation is established and illustrated in the chapter, expanding on the information and concepts developed in chapters two and three. Chapter four also provides information to the Government estimator regarding the selection of cost pools and the utilization of source documentation, and area which was lacking in both the Handbook and the DOD CITA course material.

The fifth chapter summarizes the findings and makes related recommendations.



## II. THE FULL COST CONCEPT

### A. OMB CIRCULAR A-76

One of the criticisms of previous versions of the A-76 circular was that the in-house costs to the Government were determined on an incremental basis, rather than on a fully allocated basis.<sup>[4:39]</sup> The logic supporting the incremental method of computation was that when compared to contract costs, it would include only the amount by which all costs (direct and indirect) to the Government would change from existing levels of activity. This would provide the most realistic financial measure available on which to base the contract versus in-house decision.

Commercial firms argue, however, that it would be equitable only if the in-house cost estimate were prepared on the same basis that private industry must use when bidding for Government contracts; a fully allocated basis.<sup>[4:43]</sup> Industry was pushing for allocation of costs of all echelons to the final cost objectives, similar to the way they allocate Home Office Expenses. For example, a portion of the expense of the Pentagon operations would be allocated to each C/I function. The incremental method acknowledges that costs of operating the Pentagon will continue, whether or not a station decides to contract a C/I function, thus it is not relevant to the in-house/contract out decision.



As an equitable compromise, the current Handbook concedes that:

A portion of the general and administrative expenses incurred above the installation level are applicable to the product or service being estimated. However, for purposes of this Handbook, only those G & A expenses which contribute directly to the actual operation of the organization will be included in the estimate. [1: Chap III,G,1]

This excludes costs of upper echelon and staff, which provide only policy, funding, planning, and other staff functions. In all other aspects, the Government Cost estimate is to be based on the full cost method similar to the generally accepted accounting principles used by private industry. Thus, for cost estimating purposes, a Naval shore activity is usually considered comparable to a commercial firm offering similar services or products.

The current OMB Circular A-76 establishes some common ground rules for the cost comparisons. The rules which pertain to full costing state:

(2) Standard cost factors will be used as prescribed by the Cost Comparison Handbook and as supplemented by agencies for particular operations. It will be incumbent on each agency to defend any variations in costing from one case to another.

(3) Cost comparisons are to be aimed at full cost, to the maximum extent practical in all cases. All significant Government costs (including allocation of overhead and indirect costs) must be considered, both for direct Government performance and for administration of a contract. (1: Chap. I. D)

The authors of this circular have made a logical decision that the full cost method is a better indicator of the



actual Government in-house costs than the incremental method. To assist and to promote uniformity between the various agencies' cost comparisons, not only has the format been provided, but standard percentage rates are prescribed in the circular for Government employee future benefits, cost of capital, contract administration, etc.

#### B. COST ACCOUNTING IN THE PRIVATE SECTOR

There are several reasons for cost accounting in private enterprise. It is necessary to keep track of expenses and sales, and to report profits and losses external to the organization. It is also necessary for tax purposes, as well as for internal management and control. While there are many well-established rules of accounting, there is usually more than one acceptable method to obtain similar results, while staying within the rules.

Generally Accepted Accounting Principles (GAAP) have been used to establish rather vague boundaries, within which accountants must operate. There are no printed lists of GAAPs, but only a consensus of opinion and "generally" practiced accounting methods. GAAPs normally apply to financial accounting, but the concept can be and has been extended to include cost accounting and accounting of non-profit institutions. [8:49-50]

The American Institute of Certified Public Accountants (AICPA) has established the Accounting Principles Board (APB)





in an effort to formalize recommended accounting methods. The APB publishes: (1) ARS Accounting Research Studies, (2) ABP Statements, which are advisory in nature, (3) APB Opinions, which are official positions. [8:52]

### C. FEDERAL CONTRACT COST ACCOUNTING

Congress became concerned about the inconsistencies and the lack of uniformity in the cost accounting procedures used by private business when doing business with the Federal Government on a negotiated contract basis. After a one and a half year study, Congress established the Cost Accounting Standards Board (CASB). The board's objectives were to: (1) promote uniformity and consistency in accounting methods; (2) deal with the allocability of cost, not allowability of cost; (3) adhere to a "full costing" concept. As an agent of Congress, and in relation to Federal Contracting, the CASB's standards have the effect of laws for defense contractors and subcontractors. [8:126]

Since large defense contractors must conform to the Cost Accounting Standards (CASs), it would be prudent for the Government estimator to be familiar with the pertinent Standards. Most of the Handbook's Government methods align closely with several of the CASs which deal with the "full costing" concept. A summary of those standards which apply to operations overhead follow.



1. CAS 401 Consistency in Estimating, Accumulating,  
and Reporting Cost

This Standard simply requires that, once an expense item has been identified as either direct or indirect, it should be both estimated and accounted for in the same manner. This rule applies to consistency in forming cost pools, as well as selecting allocation bases. [8:205]

Although the Navy estimator cannot change the Navy's accounting system to full costing, the estimator should be consistent by using the same operations overhead expense items when estimating subsequent contracts for functions falling within the same operational department.

2. CAS 402 Consistency in Allocating Costs Incurred  
for the Same Purpose

Under this Standard, costs incurred for the same purpose, in like circumstances, shall be consistently charged as direct costs, or if indirect costs, shall be consistently allocated. [8:206] What works on one estimate should be done on similar estimates.

3. CAS 405 Accounting for Unallowable Costs

Unallowable costs for Government contracts may be unauthorized marketing expenses, such as advertising or social business expenses. Such unallowable costs are to be identified, but excluded from any billing to a Government contract. If unallowable costs would normally be part of a regular indirect cost allocation base, they shall remain in



such bases.<sup>[8:244]</sup> As an example, assume a supervisor over two work centers, one in which the function is being estimated, and the other which is all military. Although for purposes of the Handbook, direct military labor is not "allowable," the allocation of the supervisor's expense (indirect labor) would be allocated in proportion to the total direct labor hours, both civilian and military.

#### 4. CAS 409 Depreciation

This Standard deals with most of the significant variables in accounting for depreciation. (a) To determine the cost of the asset to be depreciated, the estimated residual, or salvage, value is subtracted from the asset's total cost. (b) The estimation of service life of an asset is required to determine the number of accounting periods the cost will be assigned. (c) The selection of a depreciation method should reflect the pattern of consumption of services over the life of an asset. (d) Upon disposition (sale or trade) of an asset, any resulting gain or loss from book value shall be allocated during the same period as the disposition, and in the same manner as its depreciation would have been allocated. (e) The allocation of depreciation directly to cost objectives is allowable only if such charges are made on the basis of usage, e.g., machine hours, not square footage, and it must be consistently done. The asset to be depreciated may be part of the organizational unit. If the other organizational unit costs are charged to



several cost objectives, based on measurement of the services provided by the organizational unit, then the depreciation costs are included in the same cost pool as the organizational costs. [8:104-185]

Since the Navy does not keep depreciation records, the section of the Standard dealing with the handling of gains and losses upon disposition is of little consequence to the Government estimator. Also, the Handbook specifically requires that depreciation be computed on a straight line basis, equally distributing depreciable cost to each accounting period or unit of usage covered by its useful life. [1:Chap. III D,4,C) In other respects, the depreciation Standard amplifies the intentions of the Handbook.

5. CAS 417 Distinguishing Between Direct and Indirect Costs

This proposed Standard clarifies how to determine if a cost is direct or indirect, and relates only in terms of the final product or cost objective. For purposes of the Handbook, the final product or cost objective is the function being estimated, which is not necessarily the final product of the organization. To distinguish between indirect costs and direct costs, specific criteria apply. There are three tests of direct costs: (a) the relationship between the costs and the cost objective must be clear and exclusive, (b) the amount of cost is readily and economically





accountable without causing undue administrative effort, (c) other costs incurred for the cost objective are also direct in other similar circumstances. Any cost that is not direct is indirect.

6. CAS 418 Allocation of Indirect Cost Pools

This proposed Standard deals with indirect cost pools and their allocation. A cost pool should be homogeneous, in that the included costs should have the same base.

7. CAS 419 Allocation of Overhead Costs of Productive Functions and Activities

This proposed Standard defines function as the grouping of related task. Manufacturing and engineering are examples of functions. An activity is a subset of a function. Examples of manufacturing activities are stamping, and welding, while drafting, and design are examples of engineering activities. One cost pool would be acceptable for an entire unit if one function was performed, and if it was performed equally on all products. However, if within the organization there were several production functions, there would be separate pools established. Also, if activities were different for similar products, separate costs pools would be established. A significant exception to the rule would be that a cost pool should never be added unless it made a material (+ 5%) difference to the final allocation. The overhead cost pools are composed of: (a) costs from



within the department, (b) service costs from other cost pools, and (c) outside costs.

#### D. OTHER NONPROFIT ORGANIZATIONS USING FULL COSTING

Some nonprofit organizations have nearly as much need for full cost information as a profit making enterprise does, especially for pricing purposes. Anthony and Herzlinger propose that the prices set by nonprofit organizations should be equal to full costs.

The rationale for full-cost pricing is as follows: A non-profit organization often has a monopoly position. It should not set prices that exceed its cost, for to do so would be taking unjustifiable advantage of its monopoly status. Furthermore, the organization does not need to price above cost. If it does so, it generates a profit, and by definition no person can benefit from such a profit. (Some organizations do need a small margin above costs because this is the only way they can generate funds needed for expansion.) Neither should a nonprofit organization price below full cost because that would be providing services to clients at less than the services are presumably worth; this can lead to a misallocation of resources in the economy. [7:164]

The case for collecting full costs of responsibility centers or program elements can be strongly made for pricing services provided by agencies such as Tennessee Valley Authority, hospitals, and universities. Full-cost information can help the decision-maker when considering the extent various programs should pay for themselves, or when comparing government services with similar services of private organizations. [7:123]



#### E. NAVY INDUSTRIAL FUND (NIF) INDIRECT COST DISTRIBUTION

Perhaps the nearest full-cost system operating within the Navy is that of the Navy Industrial Fund (NIF) activities. NIF operations and accounting methods are similar to private industry. The NIF activity does work for other Naval activities on a reimbursable basis. In addition to direct costs, customers are billed at a standard overhead rate which includes production overhead and G & A overhead. NIF activities do not use the same cost account system which O and M, N funded activities used under the Resource Management System.

There are several differences between the NIF accounting and full-cost accounting. The following costs are not included in the overhead rate of the NIF activities:

- (1) military personnel costs such as the military managers,
- (2) civilian severance pay, (3) any significant costs due to underutilized capacity such as idle facilities or equipment,
- (4) catastrophies or acts of God costing in excess of \$50,000,
- (5) alterations to real property facilities, and (6) depreciation.

[9: Vol. 3) However, depreciation costs are accrued at NIF activities and a portion of these costs is applied to work performed for private parties or agencies outside the Federal Government.



## F. OPERATIONS OVERHEAD - FULL COST

The Handbook deals with three types of overhead: Operations, Material and General and Administrative (G & A) Expense. Although this thesis concentrates on Operations Overhead, an understanding of the other two overhead expenses is necessary to preclude mixing or double-counting overhead costs.

In broad terms, Material Overhead is the activity's supply function costs, such as acquiring, handling, storing, and controlling. Normally these costs are collected in a cost pool as a service function, and then allocated, unless the function being reviewed is storage and warehousing (in which case it would be the producing function or cost objective).

It is also possible that a considerable amount of cost and effort is expended in Material Overhead within a cost center. For Navy accounting purposes, it is more practical to include these costs with Operations Overhead, even though the costs are material related. However, expenses of a shop stores, operated by the Supply Department would be appropriately charged as Material Overhead.

General and Administrative (G & A) expense absorbs any overhead costs not already allocated to Material or Operations Overhead. The Handbook describes G & A expenses as: financial, management, or other types of expenses which are





incurred for the benefit of an organizational unit as a whole.[1: Chap III G,1] This definition therefore excludes costs of functions which service some cost centers, but do not directly or indirectly benefit the entire organization.

Another attribute of the G & A expense is that it is general enough that only one cost pool is formed, with one common base. Usually this base is total dollar expense. Operational departments of an activity, such as the Supply or Public Works Departments, are not normally considered to be G & A expense centers. Although such departments may serve all other functions, their services are specific, rather than general or administrative, in nature. More reference to G & A expenses follows in this section.

The Handbook defines Operations Overhead costs as "indirect costs of an annual fiscal period which are necessarily incurred to produce or deliver the products/services being provided by a particular organizational element (hereafter referred to as a cost objective or a work center)."

There are ten classifications of expenses in the Overhead categories. These indirect expenses are costs which are not directly identified with a single final cost objective, but are identified with two or more final cost objectives, or with at least one intermediate cost objective.[1: Chap III,A,1,d]

For practical reasons, there are exceptions made to the guideline requiring that an indirect cost must be identified



with two or more cost objectives. As an example, the lubricating oil used directly on one machine in a repair shop is apparently a direct cost. However, since the cost is small and considered immaterial, the cost of the lubricating oil would be classified as an indirect cost and included as an indirect material under Operations Overhead.

For example, in the typical Navy vehicle maintenance shop, there is already an Overhead Cost account (6910), to which such costs as minor supplies and also Labor Overhead, are charged.

Chapter III, Section D, 4, of the Handbook gives a good description of, and explains thoroughly the application of, the ten classifications of Operation Overhead expenses. To further illustrate the application of these indirect costs within the Navy's cost accounting system, the Naval Postgraduate School Public Works Department Vehicle Maintenance work center will be used as an example final cost objective. Appendix B includes applicable organization charts.

#### 1. Indirect Labor

Within the work center (Vehicle Maintenance Shop) the mechanics who perform the direct labor also use indirect labor. Their time, charged to cost account 6950, Allowed Time Maintenance, includes officially excused time, such as: official business, standby time, training sessions, safety meetings, and tardiness. [9: sec 4-348] This allowed time obviously should not be charged as direct costs. Any



supervisor's time within this work center would also be considered indirect labor. It is not necessary to pool or allocate indirect costs collected totally with the work center.

The next echelon or management level in this illustration is the Maintenance Branch. (Appendix B). Indirect labor is also accumulated at the upper echelons. The time spent by the supervisor and the office personnel at this level is divided between the various sub-branches which are supervised. Normally, this supervision overhead expense is directly related to the sub-branches direct labor hours, which can then be used as the allocation base. Likewise, a proportion of the Shops Division Director's labor expense, cost account 7910, must be applied to the transportation maintenance.

Public Works (P.W.) Department administrative expenses, cost account 7910, as well as the PWO/APWO expenses, can normally be pooled together and allocated over the same base, total P.W. Department labor cost (direct and indirect). Other P.W. overhead costs, such as Engineering and Maintenance Control, are not allocated to Transportation, since they do not benefit or contribute to the maintenance of vehicles.

## 2. Indirect Material and Supplies

These are the overhead items such as rags, lubricants, and other minor expenses which occur in the shop, as well as



a proportionate share of the P.W. office supplies. These materials are charged to the same cost accounts as the indirect labor, and are reported under the cost element "Supplies". The Handbook states a preference for a detailed list of each item of indirect material and supplies, but when this is not practical (which is usually the case), the Handbook suggests aggregating the costs into logical sub-groupings. A third alternative, herein suggested, would be to use historical accounting data to document the indirect material and supply costs. This method of estimating should be adequate for meeting the Handbook's requirement for supporting documentation.

### 3. Depreciation

According to the Handbook, "Depreciation is the method used to spread the cost of tangible capital assets (plant, machinery, etc.) less residual value, over their estimated useful lives in a systematic and logical manner." [1: Chap III, D,4,C] It is reasonable that the cost of plant and machinery used to produce a product or service would be considered as a cost of production. Private enterprises depreciate their capital assets in accordance with tax laws, and they perform their real property accounting in accordance with generally accepted accounting principles. [10:14]

The Navy does not use depreciation accounting for real property, except to a limited extent at Navy Industrial Fund activities. The Navy's real property accounting procedures





are designed to comply with statutory requirements, as well as to provide Navy managers with factual information on capital property. [10:18-19]

Although it is intended for the Government and private enterprise cost estimates to be compared on an equal basis, it is noted there are several differences between government and private real property accounting practices. Degon lists several of these differences. (a) Private enterprise will revalue assets downward to reflect a permanent loss in value, while the Navy always maintains historical costs for real property. (b) Private enterprise makes extensive use of fair market value, the Navy does not. For example, donated property is listed as fair market value in accordance with GAAP, while the Navy records such an asset at no cost. (c) GAAP only recognizes land currently being used and with continuing future use as a real property asset, while unused land is usually treated as an investment. The Navy treats all land, in use or not, as a real asset. (d) Whereas GAAP would record the value of an asset received through an exchange at the fair market value of the exchanged item, the Navy would record the value of the asset at the historical cost of the exchanged item. [10:27, 45-46]

Degon concludes that, relative to the private sector, the initial evaluation Navy real property assets and subsequent capital investments, almost always results in an understatement, and that: "Given that the trend in the Navy



is to understate real property assets with respect to the private sector, any decisions by the Navy based on replacement value and industry standards would be in error. [10:111]

However, for the purposes of the Handbook, it is necessary to use the information available from Navy records. The fiscal officer at each Naval activity is responsible for maintaining plant property account records. [11:D-53] Records for land (Plant Property Class 1) and constructed facilities (Plant Property Class 2) may be held in the Public Works Department. Land has no depreciation. The Plant Property Class 2 records will provide the acquisition price for the entire building, as well as the total square feet, which will be used to allocate depreciation, and perhaps utility and maintenance costs.

Many of the Navy's assets are very old, and by private or Navy expected life criteria, would have previously been fully depreciated. However, the Handbook states, "An asset that is still in use should not be reflected as being fully depreciated." [1: Chap 3,D,4,c] For example, a building built in 1945, for \$11,000, may normally be expected to have a 25 year useful life, with a \$1,000 residual (scrap) value. Using straight line depreciation of  $(\$10,000/25 \text{ years})$  \$400/year, the building would have been fully depreciated in 1970. In 1980, if the building is not expected to be replaced until 1995, then the Handbook requires the annual



depreciation to be calculated over the adjusted 50 years of useful life. The annual depreciation for the building would be (\$10,000/50 years) \$200. Equipment in Plant Property Classes 3 and 4 would be similarly handled.

#### 4. Rent

The rental cost of equipment or other real property, which is used only by the one work center, should be treated as direct cost. Rental of an asset for the support of the operations overhead previously determined to benefit the work center being estimated, should use a similar allocation base as the associated operations overhead cost pool. For example, if rent were paid by P.W. on the P.W. Administration Division's copy machine would be distributed according to the total P.W. Department labor cost (direct and indirect). If P. W. Administration is located in a building that is rented, it is appropriate to determine their fair share of the rent based on square footage. The calculated rental share would still be allocated on the same basis, labor cost.

#### 5. Maintenance and Repair

The Navy does keep records and separate cost accounts in functional category M1 - Recurring Maintenance, for the accumulation of maintenance costs. The cost accounts are categorized by the type of facility in Plant Property Classes 1 and 2.



If the cost account category is too broad, it may be more useful to obtain engineering estimates for annual maintenance repair costs by type of facility. Maintenance and repair costs of equipment within a work center would probably already be charged to an overhead account, and should not be double counted. Supporting documentation to the Government cost estimate should clearly identify all sources of data and estimates used to determine the maintenance and repair expenses.

#### 6. Support Costs

These costs are usually not obvious, and should be identified by personnel familiar with the organization's inter-relationships. One case would be the cost of transportation provided to the Carpenter Shop. As part of the P.W. Operations Overhead, the custodial service provided to its administrative spaces should be proportionately applied. It is usually necessary to calculate a cost/square foot for custodial type services.

Support costs which are general or administrative in nature and which benefit the total organization are to be included in G & A expenses. Supply support is to be included in the Material Overhead portion of the cost estimates.

#### 7. Utilities

Although the Navy's accounting and reporting systems carefully monitor utility costs, most activities do not have historical records of utility costs by work center or even





by building. It is, therefore, necessary to use consistent engineering estimates to determine the utility costs as Operations Overhead expenses.

8. Insurance

The insurance cost is a calculated figure, using the previously determined personnel costs and depreciation/residual asset values.

9. Overtime and Other Premium Pay

This indirect cost category applies only to the work center being estimated.

10. Other Costs

Any other Operations Overhead costs not included in one of the other categories may be collected under this cost element.

G. SUMMARY OF THE FULL COST CONCEPT

Under the full cost concept, all costs incurred by an organization are either for the benefit of or are caused by the organization. Consequently, all costs, both direct and indirect, must ultimately be allocated to the appropriate end products or functions of the organization. Private enterprise has used the full cost accounting method extensively, and even some nonprofit institutions have made use of full cost pricing.

In an effort to make the Commercial and Industrial functions cost comparison between the private contractor and



the Federal Government more equitable, OMB has promulgated a (nearly) full cost Government estimate procedure. At the installation level, the cost estimate is full cost. One of the Handbook's deviations from the way large corporations use full costing, allows the Government to disregard general and administrative expenses incurred above the installation level.

Some of the indirect costs which are included in the Handbook are not normally accounted for at the installation level. These costs include: (1) labor fringe benefits, such as the Civil Service Retirement System, Social Security, health, life insurance, and other benefits, (2) depreciation of capital assets, and (3) casualty and liability insurance. The remainder of the indirect costs considered are usually accounted for by the installation, but Overhead costs are rarely allocated to the individual work centers.



### III. EXISTING NAVY ACCOUNTING SOURCES

The Navy's resource accounting system consists of four separate but related systems. Two of these systems, "Management of resources for operations" and "Management of Acquisition use and disposition of capital assets", provide source data useful for calculating part of the Operations Overhead expenses.

#### A. NAVY RESOURCE MANAGEMENT SYSTEM (RMS)

##### 1. Objectives and Concepts

As the name implies, the Resource Management System was intended to provide Navy managers with management information, financial and statistical, as necessary, for planning and control of Navy resources. Also, RMS was designed to meet the Navy's financial reporting requirements to the Secretaries of Defense and the Treasury and to the Office of Management and Budget.

The RMS introduced several significant aspects which changed previous Navy accounting and impacted on the quality of information available to the estimator. [11:D 4-3]

(a) Military personnel costs were included in the system.

(b) There was a clear separation between operating costs and investment or capital costs.



(c) All activities were to be charged for operating costs at the time of consumption, not when ordered or when paid for.

(d) A standardized expense account (cost account) structure was implemented throughout the Navy.

The system covered all operations financed by funds authorized through the Operations and Maintenance appropriation. The activities included in the RMS are detailed in Reference 12, NAVSO P-3006-1, but are essentially all shore activities except: nonappropriated fund activities; Research, Development, Test and Evaluation activities; industrial-commercial activities; and activities financed by operating allotments under the Appropriation Military Assistance, Executive. [12:104,105]

## 2. Cost Account Codes

The most detailed division of accumulated costs and data is at the cost account code level. The cost account codes, as listed and defined in the Navy Comptroller Manual, were established to classify transactions according to their purposes. [12:206] An example of the degree of detail provided by cost accounts may be seen in the records of a Vehicle Maintenance Shop. The work done on sedans is charged to cost account 62AO, while maintenance of half-ton pickups is charged to cost account 62G0. the maintenance of all vehicular transportation is totalled in the summary cost account 6200.





A Government function being estimated would normally use several cost accounts, and perhaps more than one summary cost account. It would be unlikely, although possible, that more than one functional cost center would use the same cost account for direct costs, e.g., most organizations would not have two cost centers repairing sedans. This situation is more likely to occur with overhead cost accounts, therefore, the estimator should be aware of where all overhead costs originate.

### 3. Navy-wide Uniform Management Report (UMR)

A key output document of the RMS is the Uniform Management Report. The UMRs were made available to the resource managers of Naval shore activities late in 1976 by the Office of the Navy Comptroller.<sup>[13]</sup> This report consolidated the two local management reports (Operating Budget/Expense Report, NAVCOMPT Form 2168, and Performance Report, NAVCOMPT Form 2169). In addition to combining the expense and performance data, the UMR was available in one of four formats (A-D) with varying levels of information to serve unique and differing management needs of the varied Naval activities.<sup>[13:1]</sup> Figure III-1 provides an example of a type C format.

Although the format varies among the four types of reports, the cost account information is readily available on each type of report. Of particular interest to the







estimator is the additional classification of expenses within each cost account code on the reports. The type C and type D reports use "expense element codes" as defined in Navy Comptroller Manual, Volume 2, Chapter 4.<sup>[9]</sup> Some of the expense element codes relate to some of the ten classifications of Operations Overhead expenses mentioned in Chapter II.

Within the indirect labor classification, expense elements A- Military Personnel and U- Civilian Personnel, are reported separately. UMR-A and UMR-B also list civilian and military expenses separately for each category cost summary code. This detailed break-down facilitates the collection of indirect labor costs. However, for purposes of the Handbook, the labor costs collected by the UMR cannot be directly utilized to determine direct or indirect labor costs. This deficiency will be considered in Section C of this chapter.

Material and supplies expenses are collected separately by expense element T- Supplies. Petroleum, oil and lubricants expenses are collected in expense elements R,S, and V. These expense elements are the most useful data the reports provide to the estimator, since indirect cost accounts can be used to directly determine indirect material costs.

Unfortunately, the indirect expense classifications of rent and utilities are combined on the UMR in expense element M- Utilities and Rents. Limited use may be made of



this expense element, since the cost pool base for rent and utilities may both be in square feet. The deficiency of the data collected in this category will be examined further in Section C of this chapter.

Support costs, as identified previously in Chapter II, may be collected in expense element code 0- Service Transfers, Unfunded. Transfer costs within the same operating budget include transfers between cost centers or distribution of overhead. The degree of use of this expense element is likely to vary between activities, and the estimator must necessarily be familiar with the activity's accounting procedure regarding transfers.

Another aspect of the UMR is that it groups costs by cost centers (departments or divisions). The function to be estimated could be a complete cost center or a portion of the cost center. If it is a portion of the cost center, the expenses in the applicable cost account codes may be collected by function.

The UMR not only reports dollar figures, but work units and actual man hours which are useful to the estimator. UMR formats A and B report direct and reimbursable expenses together, while formats C and D print out separate sheets for reimbursable and direct activity expenses. If the UMR becomes the source document for any portion of the estimate, the estimator must include both direct and reimbursable expenses incurred by the function being estimated.





#### 4. Plant Property Accounting

The "tangible capital assets" referred to in the Handbook's discussion of depreciation, corresponds to the Navy's definition of "plant property" for shore establishments. Although the Navy plant property accounting system has not dealt with depreciation, it has maintained physical, statistical, and financial data on the Navy's plant property. [11:D-52]

There were four classes of plant property in the Navy's inventory control system. Plant property class 1 (land) is not considered depreciable. Inventories of plant property class 2 (buildings, structures, utility distributing systems and other similar improvements) have been maintained at the Navy Facilities Systems Office (FASCO). Individual activities receive and hold property records similar to Figure III-2. Detailed instructions concerning the property record forms and reporting procedures are contained in NAVFAC P.78, Navy Facility Assets Data Base Manual. [14:174]

The class 2 property records provide most of the data necessary to calculate the depreciation of facilities. The estimated figures for the useful life of facilities should be engineering estimates. The pertinent data provides the date of acquisition and costs, as well as physical measurements. The function and supporting overhead functions being estimated should be allocated a proportionate share of the total building annual depreciation expenses, according to



PLU, CLASS 2 PROPERTY RECORD  
 (004) UIC..N62271 (001) PR NO.....2-02350  
 NAVPGSCOL MONTEREY CA (005) FACILITY NO..403  
 (106) SPEC AREA....

LOCATION GENERAL INFORMATION  
 (101) COUNTRY..US UNITED STATES (007) ACTION.....CORRECTION  
 (102) STATE....06 CALIFORNIA (008) FAM HOUSING....NO  
 (103) COUNTY...053 MONTEREY (009) EC DATE.....  
 (104) CITY.....2250 MONTEREY (011) PR REVIEW DATE..  
 (105) NO.....11 (010) FACILITY NAME..  
 (107) MAP GRID.233 TRANSPORTATION OFFICE

ACQUISITION MEASUREMENTS  
 (201) ESTATE.....18 N/PURCHASE +(301) LENGTH.... 105 FT  
 (202) ACQ CONTRACT... +(302) WIDTH..... 30 FT  
 (203) ACQ DATE.....01 JUN 48 (303) HEIGHT.... 17 FT  
 (204) GOVT COST..... \$5,773 +(304) AREA..... 2,930 SF  
 (207) LAND CON.....91110 (305) STORIES... 02  
 (307) IRREGULAR. YES

CONSTRUCTION  
 (401) YEAR BUILT.....1925 (404) ABMP CODE.....  
 (402) CONSTRUCTION TYPE..TEMPORARY (407) PROJECT NO.....  
 (403) YEAR IMPROVED..... (410) HISTORIC IND...

STATUS / UTILIZATION  
 (502) CATEGORY CODE...21420 (501) USE..AUTO VEHICLE MAINT NONCOMB  
 (510) USER UIC.....N62271.....NAVPGSCOL MONTEREY CA

AREA/SF*	OTHER/	ALT/	DEF CODES
ADEQ(515)	(516)	(517)	(524)
SBST(518).....2,930.00	(519)	(520)	(525)F30
INAC(521)	(522)	(523)	(526)
TOTAL 2,930.00			

79JUN20 EFD.N62474 MC.N00062 \*ACTIVITY.N62271 PR.2-02350

FIGURE III-2



the actual square feet occupied. The square foot measurements may also be used for calculations of estimated utility expenses, custodial services or other expenses which relate to area.

Plant property class 3 and class 4 account for equipment, and for industrial equipment and machine tools having an initial acquisition cost of \$1000 or more. The equipment used in support of the function being estimated must also be depreciated, and the annual expense allocated as part of the Government's cost to perform the function.

Property record cards similar to Figure III-3 provide a record for each item of equipment. "Detailed instructions on accounting for plant property are contained in the Navy Comptroller Manual Volume 3."[11:D35]

Within the Navy, minor property such as desks, tables, chairs, filing cabinets, etc., has been considered capital in nature, even if costs are less than \$1000. However, because of their minor costs, in comparison to the total expenses of most functions, it will not normally be necessary to depreciate minor property. It is this writer's opinion that minor property should be expensed and accounted for in the period of acquisition in accordance with GAAP. The Cost Accounting Standards Board has a set criteria for the capitalization of tangible assets: (a) an acquisition cost of \$500 or less, (b) a minimum service life of two years or less.[11:181] Since the Navy has already established a





FIGURE III-3

11 MAR 1980

DOD PROPERTY RECORD				1. <input type="checkbox"/> ACTIVE <input checked="" type="checkbox"/> INITIAL <input type="checkbox"/> IDLE <input type="checkbox"/> CHANGE		2. JULIAN DATE 0071		3. DOD GOVERNMENT TAG NO 62271 018063		Form Approved Budget Bureau No. 22 Ro209	
				SECTION I - INVENTORY RECORD						ELEC (52)	
4. COMMUNITY CODE 6625-AC		5. STOCK NUMBER 3165-2800		6. ACQUISITION CODE 5047		7. TYPE CODE 1		8. PART AM CODE 80		9. PART CL CODE 11	
10. STATUS CODE 1		11. SWI CODE 1		12. COMMAND CODE 00062		13. ALLOCATION CODE 228					
14. NAME OF MANUFACTURER TEKTRONIX, INC.						15. M.I.R.S. CODE 80009		16. MANUFACTURER'S MODEL NO. 5LN4		17. MANUFACTURER'S SERIAL NO. B061567	
18. LENGTH 1		19. WIDTH 5"		20. HEIGHT 5"		21. WEIGHT 7		22. CERTIFICATE OF NON AVAILABILITY NUMBER N62271-0025-0002		23. ASOJ NO.	
								24. ARJ		25. CONTRACT NUMBER PO N62271-80-F-0150	
26. DESCRIPTION AND CAPACITY ANALYZER, SPECTRUM, PLUG-IN TYPE  FREQ RANGE: OHZ TO 100KHZ, DIAL READOUT RESOLUTION: 500HZ, FREQ SPAN: 10KHZ/DIV TO 20HZ/DIV, RESOLUTION BANDWIDTH: 3KHZ TO 10HZ, BUILT IN TRACKING GENERATOR: 20HZ TO 20KHZ LOG SWEEP. THIS UNIT OPERATES IN CONJUNCTION WITH THE TEKTRONIX 5111 OSCOPE. MAINFRAME 6625-AC											
CONTINUED ON REVERSE SIDE <input type="checkbox"/> YES <input type="checkbox"/> NO											
SECTION II - ELECTRICAL CHARACTERISTICS											
QUANTITY	HORSEPOWER	VOLTS	PHASE	CYCLE	AC	OC	SPEED	TYPE AND FRAME NUMBER			
28. PRESENT LOCATION  NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIF								28a. OPEC CONTROL NO.			
								29. POSSESSOR CODE 200-233 62271(7685435)			
SECTION II - INSPECTION RECORD											
								YES	NO		
30. CAN ITEM BE STORED AND MAINTAINED ON SITE FOR AT LEAST 10 MONTHS?											
31. HAS ITEM BEEN REBUILT/OVERHAULED? IF SO, WHEN?								DATE			
32. HAS ITEM BEEN MODIFIED FROM ORIGINAL CONFIGURATION? IF SO, EXPLAIN UNDER REMARKS BELOW											
33. WAS ITEM INSPECTED UNDER POWER? IF NOT, EXPLAIN UNDER REMARKS BELOW											
34. ARE MAINTENANCE COSTS NORMAL? IF NOT, EXPLAIN UNDER REMARKS BELOW											
35. ARE SAFETY DEVICES ADEQUATE AND SATISFACTORY? IF NOT, EXPLAIN UNDER REMARKS BELOW											
36. ARE INSTALLATION INSTRUCTIONS AVAILABLE FOR TRANSFER?											
37. ARE OPERATING INSTRUCTIONS AVAILABLE FOR TRANSFER?											
38. WAS ITEM LAST USED ON A FINISHING OPERATION?											
39. WILL ADJUSTMENTS OR CALIBRATION CORRECT DEFICIENCIES?											
40. IS ITEM SEVERABLE WITHOUT DAMAGE TO COMPONENTS? IF NOT, GIVE THEIR REPLACEMENT COST								\$			
41. IS ITEM IN OPERABLE CONDITION?											
42. MOST ITEMS REPAIRED OR BUILT OVER- Hauled TO PERFORM SPECIFIED FUNCTIONS?											
43. DO YOU RECORD INDICATE SATISFACTORY PERFORMANCE IF NO, EXPLAIN UNDER REMARKS BELOW											
44. ARE MANUALLY OPERATED MECHANISMS IN WORKING ORDER? IF NO, DESCRIBE UNDER REMARKS BELOW											
45. ARE SCALES, DIALS AND GAUGES WORKING AND READABLE? IF NO, DESCRIBE UNDER REMARKS BELOW											
46. ARE HYDRAULIC PUMPS, VALVES AND FITTINGS OPERATING PROPERLY? IF NO, DESCRIBE UNDER REMARKS BELOW											
47. ARE ELECTRONIC SYSTEMS AND CIRCUITS OPERATING PROPERLY? IF NO, DESCRIBE UNDER REMARKS BELOW											
48. HOW MANY HOURS WAS ITEM USED BY CURRENT POSSESSOR?											
49. EXPLAIN UNDER REMARKS LAST USE OF EQUIPMENT DESCRIBED IN ITEM 26 ABOVE											
50. ESTIMATED COST FOR PACKING, CRATING, HANDLING								\$			
51. INDICATE DATE ITEM WILL BE AVAILABLE FOR REDISTRIBUTION											
52. CONDITION CODE										N-1	
53. OPERATING TEST CODE											
SECTION III - REMARKS											
54. REMARKS  STUB: 0024-0050 (OPN) REC: 2/25/80 CONS: TEKTRONIX, INC., SANTA CLARA, CALIF											
REMARKS CONTINUED ON REVERSE SIDE <input type="checkbox"/> YES <input type="checkbox"/> NO											
SECTION IV - DISPOSITION RECORD											
55. CONSIGNEE (NAME AND ADDRESS, INCLUDING ZIP CODE)								56. TYPE OF DISPOSITION <input type="checkbox"/> DONATION <input type="checkbox"/> DESTRUCTION <input type="checkbox"/> SALE <input type="checkbox"/> ABANDONMENT		56a. DATE OF DISPOSITION AND PROCESS IF SOLD	
SECTION V - VALIDATION RECORD											
57. VALIDATION (TYPED NAME(S) AND SIGNATURE(S))											

DD FORM 1342  
1 FEB 68

PREVIOUS EDITIONS OF DD FORM 1342 ARE OBSOLETE.  
REPLACES DD FORMS 1342M, 1342S, AND 1342SM WHICH ARE OBSOLETE.

S/N 0102 LF 012 0001





cut-off value of \$1000 for asset record purposes, the benefit of estimating annual depreciation on minor property costing between \$500 and \$1000 is considered ludicrous in most cases. However, functions which use a significant amount of equipment, machines, and tools costing between \$500 and \$1000, should include depreciation of minor equipment in their estimates.

## B. LIMITATIONS OF THE NAVY ACCOUNTING SOURCES

### 1. Value of UMR to the Government Estimator

The usefulness of the UMR for full cost estimating was found to be limited. The arrangement of the data by cost centers and the detailed breakdown of expenses by cost accounts and expense elements, was conducive to collecting costs. However, the actual expenses of the cost accounts could not generally be used directly to prepare the cost estimate in accordance with the Handbook guidelines.

A comparison of the Handbook requirements with the UMR data is shown in Figure III-4.

#### a. Indirect Labor

The indirect labor data recorded in the UMR does not separate wages from fringe benefits. Also, the fringes included in the UMR are based on different rates than those in the Handbook. The civilian labor acceleration rate, established locally, is applied to all regular time civilian labor, to the straight time portion of all overtime civilian



OPERATIONS OVERHEAD  
EXPENSES

HANDBOOK REQUIREMENTS

UMR DATA

1. <u>Indirect Labor</u>		
a. Military Wages	DoD Accounting Guidance Handbook for military wages [2]	Only one military expense, based on composite standard. Does not include retirement
Fringes	Operations and maintenance support percentages for Officer & Enlisted vary, 8% Officer, 23% Enlisted, 26.5% for all retirement	No separation between Officer and Enlisted
b. Civilian Wages	Basic rate plus leave and holidays	Civilian labor expense accelerated rate established individually by each installation
Fringes	Retirement 20.4%, FICA 6.3%, Health & Life Ins. 3.7%, Other 1.9%	Established locally. 30%+ for reimbursables; 10% for fringe benefits, 20% for leave costs
2. Indirect Material and Supplies	Itemized list or grouping of items	Reported by cost account & under expense element T- Supplies
3. Rent & Utilities	Separate rent & utility expenses in support of the function	Rent & utility expenses combined on UMR. Utilities costs reported by site, not by building
4. Maintenance & Repairs	Expenses to maintain capital assets; buildings, & equipment	Reported by broad cost account groupings, i.e., storage, medical, etc.
5. Support Costs	Intra-organization support of the function	Expense element O- Service Transfers, not consistently used at all installations

COMPARISON OF HANDBOOK REQUIREMENTS WITH UMR DATA

FIGURE III-4



labor, and to the premium portion of all civilian labor performed on a holiday.[9: Vol 3] It is not likely that the local acceleration rate will match the Handbook requirements. Because of this difference, the UMR data for labor expenses is not easily used for the estimating purposes of the Handbook.

b. Indirect Material and Supplies

For cost estimating purposes, the most useful information on the UMR is the expense reported by cost accounts with expense element T- Supplies. Once the estimator establishes the appropriate cost accounts, the supplies portion of the costs may be directly allocated as indirect material and supplies for Operations Overhead. Care should be taken not to include Material Overhead expenses in this category.

The ability to use the UMR to document past indirect material costs would possibly eliminate the Handbook requirement of listing each item or group of materials used in this category. This data would save the estimator considerable time and effort otherwise required if detailed listing were to be made.

c. Rent and Utilities

Unfortunately, as previously mentioned, rent and utilities costs are not separated on the UMR. Also, utility costs are not charged to work centers. Utility operation



expenses, as well as utility maintenance expenses, are collected by separate cost accounts identifying the type of utility, such as steam and hot water, purchased electricity, and potable water plant. The utility expense information, available from the Public Works Department, is also separated by type of utility and site. A site may include all the buildings at a Navy activity, or an activity may have several sites in remote areas.

Except for unique circumstances, it would be most practical for the estimator to use engineering estimates for the cost of each utility service based on a unit cost per square foot. Utility rates vary between buildings, since type of construction, type of heating, power dependent use and occupancy level is likely to differ from building to building. The UMR may be used as a check for the total utility expense of a site, as compared with the total engineering estimate for a site.

#### d. Maintenance and Repairs

Maintenance and repair expenses are collected by cost account as to the type of facility. However, the types of facilities which are grouped together may vary in age and use. For example, cost account 7110 Training buildings may include a new multi-story classroom structure, as well as an old electronics laboratory building. Otherwise, if the function being estimated coincides with the cost account category, the actual annual costs over the last few years





could be directly determined from the UMRs.

e. Support Costs

Although the UMR provides for the recording of support cost via expense element O- Service Transfers, the actual utilization may vary between Naval activities. The quality and content of the expenses collected in this expense element should be closely evaluated by the estimator, and the content must be documented for audit purposes. The time-saving value of this data is minimal for the estimator.

2. Value of Plant Property Records to the Government Estimator

The Handbook has recognized the fact that the Government agencies do not keep depreciation accounting records. Consequently, detailed methods of calculating depreciation are provided by the Handbook. The historical information and statistical information provided on the property records provide the majority of the necessary source documentation. It will be necessary to obtain engineering estimates for the current life expectancy and residual cost of each asset.

The square footage information on the class 2 property records could be helpful to the estimator for the distribution of unit costs which vary with area, i.e., utilities, custodial services, and depreciation.

3. Total RMS Evaluation

In January 1980, the General Accounting Office (GAO) reported to the Secretary of the Navy the results of its



findings regarding the usefulness of financial reports produced by the RMS.<sup>[15]</sup> The key criticism of the systems was that the reports were not used in the field or at headquarters.

The Naval Telecommunications, Unit, Cheltenham, Maryland, was found to use the reports for comparison with their memorandum accounting records only to advise senior commands of omissions from the reports. The reports were not used to conduct day-to-day operations.

It was further found that the expense report (UMR) was not used by station personnel because it was not current, and because they controlled expenses by cost centers, rather than by accumulating all expenditures by type. The performance statement which was to compare planned expenses with actual expenses (and work units), only showed actual expense per work unit on seventy-eight percent of the pages in a one month report. No comparison was possible. Also, the report erroneously showed the station's expenses at 120 percent of budget, while other reports indicated activity funds were still available. Other RMS reports were not used for similar reasons.

The limited experience of the writer with UMR's has also found the UMRs of limited use.

The GAO report recommends that the RMS reports be redesigned to meet users' needs, and that the new format be included in the Navy's Integrated Disbursement and



Accounting (IDA) system, which is expected to be fully operational by July 1984. The Navy has planned to update the RMS reports after the full implementation of IDA.

With the questionable accuracy of UMR, the estimator may need to evaluate the usefulness of the entire report. If the report is accurate, the data for certain indirect costs will be useful for the preparation of the Government cost estimate.



#### IV. ALLOCATION OF OPERATIONS OVERHEAD TO COST OBJECTIVES

##### A. GENERAL DISCUSSION

To adequately prepare the full cost Government estimate, the estimator should first understand the total organizational structure and its functional relationships. Most Naval activities are structured with clear operational relationships evident in the organization charts. However, there may be instances of functional relationships which are not apparent on organizational charts. Secondly, it is necessary for the estimator to determine which cost centers of the organization perform services or provide benefits for other cost centers.

When discussing factory overhead, Matz and Usry recommended that, for accounting purposes, the plant be divided into segments called "departments" or "cost centers".<sup>[6:Chap.10]</sup> This process, which they term "departmentalization", is done routinely in all Navy organizations, and the costs are collected by "cost centers" and reported on the UMRs. However, Matz further utilizes the departmentalization concept by classifying the departments as either producing departments or service departments. These classifications are required for the allocation of services to production departments in order to achieve full costing.





In manufacturing, a producing department is one which engages in the actual manufacture of the end product or the final cost objective and a service department renders a service to the final cost objective. [6:249] The Handbook defines the final cost objective as the product or "service" being estimated. [1:Chap.III A.1.b] For example, technically the NPS Public Works Department Vehicle Maintenance Shop is a service department (totally indirect cost) since the shop provides a supporting service to the educational departments of the School. However, when estimating the Government's cost for the vehicle maintenance function, the shop is to be considered as the final cost objective.

It is usually preferable to allocate the service department costs directly to the final cost objectives, rather than to sub-allocate to other service departments. However, if the estimator determines a direct allocation will not reflect a true beneficial relationship, and will cause a significant difference in the end result, then a sub-allocation method should be utilized.

The allocation process has not been adequately described in either the Handbook or the CITA course material. This chapter will develop a standard allocation method, in an attempt to bridge the gap between the Navy data and the full cost requirement.



## B. THE ALLOCATION PROCESS

### 1. Identify All Cost Centers Relevant to the Final Cost Objective

#### a. General

The first step in cost identification would be to consider any services provided from outside the immediate command which might be considered as operations overhead. The services provided to a tenant command are usually detailed in an Intra-Service Support Agreement, and may or may not be reimbursable. Services and support provided by more distant commands are likely to be either disregarded, if they receive only funds and policy guidance, or classified as G & A expenses. "Interagency Support" is covered in Chapter III, Section E of the Handbook.

Secondly, the services provided from within the local organization must be evaluated in relation to the final cost objective. Operations Overhead costs may be found in two areas of an organization, within the same department and from outside the department. For example, if the security guard service was being estimated, the secretary in the Security Department would contribute to the Operations Overhead from within the department. However, the Public Works Department may provide the Security Department with vehicles, which are also part of the Operations Overhead.



All of these Operations Overhead costs which contribute to the final cost objective must be allocated proportionately to that work center. However, indirect costs incurred in the work center being estimated are directly collected, requiring no allocation.

b. Illustration: NPS Vehicle Maintenance

An evaluation of the NPS Vehicle Maintenance Shop revealed that no Operations Overhead support for the vehicle maintenance has been provided from outside the NPS command. Support to Public Works from within the NPS organization, other than Material and G & A expenses, has been limited to the Educational Media Department, which provides copy machines and printing services.

Next, support from within the Public Works Department was identified. It was noted that NPS Public Works organization differed from the standard Public Works organization<sup>[14:17]</sup> as indicated by the charts in Appendix B. Supervisory support was provided to the Vehicle Maintenance Shop by the Transportation Shop, the Maintenance Branch, the Shops Division, and the Public Works Officer and his assistant. The Administration Division and the P.W. secretary provided the only other indirect support.

2. Determination of Cost Pools

a. General

The course material in Reference 3, only considers Material, Operations and G & A overheads as cost



pools, which are the same as the major indirect cost categories. The Handbook recognizes that more than one cost pool in Operations Overhead is likely. [1:Chap.III,D,6]

It is extremely important that elements of indirect expense included in the Operations Overhead pool are appropriate and the amounts thereof are carefully estimated. It must be determined by careful study whether more than one pool of expenses is required. Also, the selection of a proper base(s) for allocation is essential to accurate estimating.

...significant differences can result from the use of different methods for allocating overhead. The choice of the appropriate method should be based on a review of the functions and their related costs within the work center. The pools and bases should be selected based on supported facts and circumstances.

Cost pools must be as homogeneous as possible.

Multiple cost pools are more likely when a single organization, such as Public Works, provides several products or services. One reason to formulate separate cost pools would be if different allocation bases, e.g., machine hours and/or direct labor hours, are necessary. The Handbook provides an excellent example of how to identify separate cost pools and how to establish subsequent overhead rates.

Another reason separate cost pools may be required is if service cost centers provide unequal support to the cost objectives. In Figure IV-1, a single cost pool and resultant overhead rate would have been possible if services were equally provided to each work center. However, it is not rational to allocate costs from Service Division 2





to Work Centers A and B, unless the expenses of Service Division 2 are minor and considered insignificant, in which case only one combined cost pool would be required.

#### PRODUCTION ORGANIZATION

Cost Pool #1	MANAGER		Cost Pool #2	
SERVICE DIV. 1	PRODUCTION DIV.		SERVICE DIV. 2	
% Support Provided From:	WORK CENTER A	WORK CENTER B	WORK CENTER C	WORK CENTER D
SERV. DIV. 1	25%	25%	25%	25%
SERV. DIV. 2	0%	0%	50%	50%
PROD. DIV.	25%	25%	25%	25%
MGR.*	25%	25%	25%	25%

\*NOTE: If the manager's time is not proportionate to the four Work Centers, but is divided equally among the three divisions, a distribution of the manager's expense should be made to the three divisions.

FIGURE IV-1

In determining the number of cost pools to establish, the estimator should consider the significance of the costs included, as well as the significance of the difference between groupings of costs. Determining



significance is judgmental, and the estimator should document the justification for combining cost centers into cost pools. The proposed Cost Accounting Standard 419 suggests a 5% difference between combining or not combining cost pools is significant.<sup>[16]</sup> It is desirable to establish the minimum number of cost pools in order to limit the number of calculations and the possibility of errors. Since not all Naval shore commands are organized the same, it is not feasible to establish Navy-wide standard cost pools.

Another factor to consider is the possible need to allocate costs of one service to another service center. Again, this should be done if it would significantly alter the end results. Matz and Usry provide illustrations of two methods which manufacturing firms use in allocating service department costs to other service departments, as well as to production departments.<sup>[6:258-263]</sup>

The sequential method transfers each of the service department's expenses, one after the other, to each remaining service department and to all production departments. The order of transfer is based on the degree the services are used by the other departments. The expenses of the department rendering the greatest amount of service are transferred first.

The second services allocation method is referred to as the simultaneous allocation or algebraic method for overhead allocation. This method uses the solving of



simultaneous algebraic equations, which take into consideration the proration of reciprocal services between all service departments. Although this method is more accurate than the sequential allocation method, it is still only an estimate. It should be used only with cases where the sequential method would provide unacceptable allocations.

Each cost pool, which may include one or more cost center(s), may also consist of each of the ten indirect cost elements described previously. Cost elements such as depreciation, rent, and utilities would probably have the same unit base of square feet. Although it would be convenient to consolidate the cost elements into one sub-cost pool, it is necessary to keep them separate in order to conform to the Handbook.

b. Illustration: NPS Vehicle Maintenance

Ideally, it would be desirable to establish a single cost pool for Operations Overhead for all of Public Works. This one overhead rate could then be applied, not only to the Vehicle Maintenance Shop, but to any other shop. A single rate would greatly facilitate the preparation of any future Government cost estimates for the other Public Works work centers.

Theoretically, it would be more accurate to establish a separate cost pool and overhead rate for each cost center, i.e., branch and division, APWO and PWO. This



position could be justified, since each cost center contributes in varying degrees to the final cost objectives.

A more practical solution, in deciding how many cost pools would be required, could be based on an analysis of the general (vice detailed) functional relationships within the P.W. As a result, there would be two separate Public Works overhead cost pools, a major cost pool and a minor Engineering/MCD cost pool.

It was found that the Housing Office and the Resident Officer in Charge of Construction (ROICC) were independent functions which did not contribute to the operations of the P.W. shops. Thus, those expenses would not be included in the overhead rate. A percentage of the PWO's, APWO's, and the secretary's expenses would be subtracted from their total expenses based on the estimated time spent as related to those functions, rather than establish a separate cost pool.

The Maintenance Control Division (MCD) and the Engineering Division were included in a separate cost pool, since they obviously do not support the Transportation Shop in most instances. MCD did benefit all of the other production shops, while Engineering did not directly benefit all of the other shops, such as the Emergency Service Shop. However, any difference of allocation results would be negligible, since the Engineering expenses are minor, relative to the total productive shop expenses.





The Administration Division provides financial and office services to the other divisions. However, it was decided that its expenses could be allocated directly to all of the production shops, based on direct labor expenses similar to PWO, APWO, and secretary expenses.

The direct line of supervision to the production shops, the Shops Division, the Maintenance Branch, and the Utilities Branch were all found to provide supervision which could also be allocated based on direct labor expenses. The Activity Civil Engineer (ACE) function indirectly served the P.W. production effort, and also provided direct supervision of T Division. The T Division was the military section of the Transportation Operations Shop. Since the ACE was only one junior officer position, it was combined in the main cost pool.

#### c. Summary

The analysis of the P.W. organization resulted in two cost pools, both of which use an allocation base of direct labor expenses. The first cost pool includes all overhead functions, except Housing, ROICC, Engineering, and MCD. The overhead rate established from this cost pool may be used to apply to all productive shops/cost objectives. The second cost pool is composed of only Engineering and MCD. Its respective overhead rate may be applied to all productive shops, except the Transportation Shop. The second



cost pool is not needed for this particular illustration, but would be useful in estimating the full cost of other shops.

### 3. Collection of Costs

#### a. General

Since the Navy's accounting system is not a full cost system, and the rates used by the Navy differ from those established by the Handbook, it is necessary for the estimator to calculate the values for most of the cost elements. The suggested source documents for calculating the Operations Overhead by cost element are listed on Figure IV-2. For audit purposes, it is necessary that the backup documents and calculations be retained, so the estimate might be reproduced at a later date.

Indirect costs must be collected by cost elements in each cost pool to conform to the Handbook requirements. When cost centers within the same cost pool are located in different facilities with different depreciation and utility rates, it is desirable for auditing purposes to maintain a separate cost breakdown similar to the example shown in Figure IV-3. Once the total indirect cost pool and work center costs are determined, the estimator may proceed to the next step of establishing an overhead rate.



<u>COST ELEMENTS</u>	<u>SOURCE DOCUMENTS</u>	<u>REMARKS</u>
1. Indirect Labor	Manpower Listing OPNAV Form 5320/3A	Provides number & pay grade of military & civilian
Military Wages	Standard Schedule	See DoD Accounting Guidance Handbook for Military Wages and Reference 3
Fringes	None	
Civilian Wages	Local salary & wage schedules	--
Fringes	None	Calculate using Handbook rates
2. Indirect Materials & Supplies	UMR	Include all appropriate cost accounts, expense element T
3. Depreciation Plant Property		
Class 2	Class 2 Property Records	Property records provide date & cost of acquisition
Classes 3 & 4	DoD Property Record DD Form 1342	Engineering estimate required for life expectancy & residual value
4. Rent	Local lease agreements	Prorate annual cost according to use
5. Maintenance & Repair	None	Calculate using Engineering estimate (UMR may be used)

SUGGESTED SOURCE DOCUMENTS FOR THE OPERATION OVERHEAD COST ELEMENTS

FIGURE IV-2



<u>COST ELEMENTS</u>	<u>SOURCE DOCUMENTS</u>	<u>REMARKS</u>
(continued)		
6. Support Costs		
Reimbursable	NAVPCOMPT 140	
Non-reimbursable		Obtain an estimate of non-reimbursable ops overhead support from supporting activity
7. Utilities		
Telephone	Local telephone bill	Calculate annual rate based on number of phones and extensions
Fuel Heating	None	Calculate, using engineering estimates
Electricity	None	Calculate, using engineering estimates
Water	None	Calculate, using engineering estimates
Sewage	None	Calculate, using engineering estimates
8. Insurance	None	Calculate, using Handbook rates
9. Overtime and Other Premium Pay	None	Calculate, using historical records for basis of estimate IAW Handbook requirements (Chap. III,D,4,1)
10. Other Costs	Unknown	Use any available records

SUGGESTED SOURCE DOCUMENTS FOR THE OPERATION OVERHEAD COST ELEMENTS

FIGURE IV-2





COST POOL #1				COST POOL #2	
Cost Elements	Work Centers	Production Division	Service Div. 1	Manager	Service Div. 2
1	\$XX	\$XX	\$XX	\$XX	\$XX
Thru	-	-	-	-	-
10	XX	XX	XX	XX	XX
TOTAL	<u>\$XXX</u>	<u>\$XXX</u>	<u>\$XXX</u>	<u>\$XXX</u>	<u>\$XXX</u>

#### PRODUCTION ORGANIZATION OPERATIONS OVERHEAD

FIGURE IV-3

#### b. Illustration: NPS Vehicle Maintenance

The Operations Overhead costs are collected by cost elements for the Vehicle Maintenance Shop, the Transportation Shop, and each of the cost centers in the main cost pool. The other P.W. cost pool (Engineering and MCD) does not need further consideration, since it does not contribute to the transportation effort.

Those cost centers which were separately identified, but were physically located together, e.g., the Administrative Division, the ACE, the secretary, the PWO, and the APWO were in the same building, may be combined into sub-cost pools, since the expense element unit rates were the same.



(1) Indirect Labor. In the transportation shop, indirect labor includes nonproductive time not reported as direct labor. Nonproductive time may include training, supervision, or other excused time. An estimate was made from the total annual hours in cost accounts 6910 and 6950 as reported on the UMR. The civilian and military indirect labor expenses for the cost pool were calculated based on the Manpower Listing (sample Figure IV-4) and the appropriate pay schedules, as indicated on Figure IV-2. The instructions for performing the labor calculations were contained in the Handbook and course material references 1 and 3.

(2) Indirect Materials and Supplies. All of the indirect material and supplies expenses were taken from the UMR for end of fiscal year. The expense element T, on both reimbursable and direct UMRs, was used from each applicable cost account. For example, all of the Public Works Administrative Division supplies were collected in cost account (C/A) 9110 on the direct UMR, Figure III-1. More than one fiscal year's report was check to insure that the latest indirect material cost was not unusually high or low.

(3) Depreciation. The amount of depreciation was calculated using the class 2, 3, and 4 property records of all buildings and equipment used by each of the applicable cost centers. An engineering estimate of the life



## MANPOWER LISTING (CONTINUATION SHEET)

IN FORM 5320-34 S N 0107 LF 776 9350

REF:

MILIT 5320.2 (Series)

ACTIVITY NAME		POST GRAD SCH MONTEREY		DEPARTMENT MILITARY OPERATIONS AND LOGISTICS		PAGE NO	
10	11	12	13	14	15	16	17
38100	MSC		1	<u>FOOD SERVICE DIVISION</u>			
38120	MS1		1	Enlisted Dining Facility Supvr (XK)			
38140	MS2		1	Galley Watch Captain (XK)			
38160	MS3		1	Galley Watch Captain (XK)			
38180	MSSN		1	Cook (XK)			
38240	MS3		1	Cook/Baker (XK)			
38260	MS2		1	Cook/Butcher/Baker (XK)			
	MSSA			Jack of the Dust (XK)			
	MSSR			Cook			Trans 1/79 Trans 1/79
33100	4250		1	<u>PUBLIC WORKS DEPARTMENT (43)</u>			
33100	4250	CDR	1	Director of Public Works (FO)			
33140	9442	LT	1	Assistant Public Works Officer (FO)			
2433	5100	ENS	1	Activity Civil Engineer (1F)			
2619				Clerk (Stenography) (FO)	GS-312-04	1	
				Clerk (Typist) (FO)	GS-322-03	1	
2498				<u>Administrative Division</u>			
2632				Administrative Officer (FO)	GS-341-09	1	
2495				Telephone Operator (FO)	GS-382-03	1	
2668				Fiscal Accounting Supervisor (FO)	GS-501-07	1	
2597				Acctg Tech (Typing) (FO)	GS-525-04	1	
2535				Acctg Tech (Typing) (FO)	GS-525-04	1	
2362				Accts Maint Clerk (Typing) (FO)	GS-520-04	1	
				Budget Clerk (Typing) (FO)	GS-501-05	1	
				Student Aid	YW-3506-00	(1)	

FIGURE IV-4



expectancy and residual value of these assets was obtained and recorded as part of the supporting documentation. Using this source data, the annual depreciation was calculated in accordance with the Handbook criteria. An example of the class 2 Property Record was previously shown in Figure III-2, and Figure III-3 is an example of the classes 3 or 4 property Record.

(4) Rent. There was no rented equipment or other property which benefited the Transportation Shop. The copying machines used by P.W. were rented by another NPS department. (See paragraph (6) Support Costs of this section.)

(5) Maintenance and Repair. An engineering estimate was obtained, and was included with the supporting documents, for the maintenance and repair cost of each type of space used to support the Transportation Shop. The estimated cost per square foot differed between office space and shop space.

(6) Support Costs. The cost of the copy machines and the printing costs used by the supporting P.W. offices were obtained from the Educational Media Department which supplied the machines and printing service. Custodial service expenses were determined from the contract document and were based on the square feet used by each cost center.





(7) Utilities. Standard engineering estimated rates were established for each building for heating, electricity, water, and sewage. Telephone expenses were determined from the monthly telephone bill, using the appropriate rates for all the telephones in each cost center.

(8) Insurance. The casualty and liability losses were calculated as required in the Handbook, Chapter III,D,4,h.

(9) Overtime and Other Premium Pay. There was no premium pay to consider in this illustration. Individual cost center overtime records were used where available, otherwise an estimate of overtime was made.

(10) Other Costs. No other costs were identified for this illustration.

#### 4. Develop Overhead Rates

##### a. General

An overhead rate is established for each cost pool to facilitate the allocation of the appropriate amount of the cost pool expenses to the final cost objectives. Using Figure IV-1 as an example, assume each of the four work centers performs \$100,000 of direct labor each year and cost pool #1 was estimated at \$200,000 per year. The overhead rate would be calculated (using direct labor cost as a base)  $\$200,000 / \$400,000 = .5$ . Thus, for each direct dollar spent, an additional \$.50 must be allocated for Operations



Overhead. The Handbook provides excellent examples of how to develop overhead rates using various bases.

b. Illustration: NPS Vehicle Maintenance

Since the direct labor costs of all the other P.W. shops were not known, they must be calculated using the manning documents and local wage schedules. Although the labor expenses as reported on the UMR are not equivalent to the full cost method required by the Handbook, it would be allowable to use the labor expenses reported on the UMR to determine a base.

5. Allocate Operations Overhead Costs

a. General

The amount of cost pool expenses to allocate to a specific final cost objective is determined by multiplying the overhead rate by the number of base units used by the final cost objective. As was previously mentioned, it is possible to allocate service center costs to other service centers, using either the sequential or the algebraic methods.

The allocated costs are then added to the indirect costs actually accrued in the final cost objective. The total figure then becomes the fully estimated cost of Operations Overhead, and can be used on line number five of the Handbook's Cost Comparison Form, Figure IV-5.

b. Illustration: NPS Vehicle Maintenance

The amount of allocation of the cost pool



(DEPARTMENT OR AGENCY)  
 COMPARATIVE COST OF IN-HOUSE AND CONTRACTING-OUT  
 PERFORMANCE OF (PRODUCT/SERVICE)

\_\_\_\_\_  
 (Date)

LINE #	COST ELEMENT	FIRST YEAR	SECOND YEAR	THIRD YEAR	ADDITIONAL YEARS AS APPROPRIATE (NOTE 1)	TOTAL	REFER- ENCE (NOTE 2)
<u>IN-HOUSE PERFORMANCE (CHAPTER III)</u>		(Enter Amounts Rounded to Nearest Dollar)					
1.	DIRECT MATERIAL						A
2.	MATERIAL OVERHEAD						B
3.	DIRECT LABOR						C
4.	FRINGE BENEFITS ON DIRECT LABOR						D
5.	OPERATIONS OVERHEAD						E
6.	OTHER DIRECT COSTS						F
7.	GENERAL AND ADMINISTRATIVE EXPENSE						G
8.	INFLATION	Not applic.					H
9.	TOTAL						
<u>PERFORMANCE BY CONTRACTING-OUT (CHAPTER IV)</u>							
10.	CONTRACT PRICE						I
11.	TRANSPORTATION						J
12.	CONTRACT ADMINISTRATION						K
13.	GOVERNMENT-FURNISHED PROPERTY						L
14.	STANDBY MAINTENANCE						M
15.	OTHER COSTS						N
16.	GENERAL AND ADMINISTRATIVE EXPENSE						O
17.	TOTAL						

NOTE 1: If more than four years are involved, use another form(s) to detail the annual cost of each year and enter the total here.

NOTE 2: Attach supporting documentation as prescribed for each element of cost for which an entry is made and identify it with the established reference. Pages should be separately numbered with the prescribed alphabetic reference and in numerical sequence; e.g., A-1, A-2, A-3, etc. The entry in this column should indicate the total number of pages submitted; e.g., A-14 means reference "A" consists of 14 pages.

FIGURE IV-5



expenses to the Vehicle Maintenance Shop was calculated by multiplying the direct labor hours of the Shop by the previously determined overhead rate. The peculiar organization and physical layout of the Transportation and Vehicle Maintenance Shop also required a separate distribution of a proportionate share of the Transportation Shop supervision expenses. These expenses were added to the Vehicle Maintenance Shop direct Operations Overhead to obtain the total full cost Operations Overhead for this shop.

#### C. STANDARDIZATION

The OMB Circular A-76, with its Cost Comparison Handbook, has done much to standardize all Government agencies in-house cost estimating procedures. However, it was not reasonable to expect that the Handbook or the DOD training course would deal with specific Navy source documentation. It was also found that the details of the allocation process were not fully expounded in the available instructions. The collection of certain costs could be obtained through more than one source document. Also, the determination of the make-up of cost pools and their allocation bases could vary considerably between independent estimators and still be within the guidelines of the Handbook.

Because these differences exist, it would be advantageous for the Navy to standardize both procedures and source documentation of the Navy's in-house cost estimates.





Consequent benefits might be:

- (1) to assist the estimator in locating data and to establish cost pools,
- (2) to minimize errors caused by independent procedural interpretations by estimators,
- (3) to aid the auditor by providing uniform use of supporting documents and procedures,
- (4) to facilitate comparisons between similar overhead functions, and
- (5) to establish standard overhead rates, should correlations between similar functions be found.



## V. CONCLUSIONS AND RECOMMENDATIONS

### A. SUMMARY

The initial premises of this writer were that the Navy's accounting system was detailed enough to enable its data to be directly used in preparing the Government's full cost estimate, and that a standard method could be established to integrate the Navy accounting with the Handbook requirements. It was found, however, that while some of the data could be used directly, the majority of the Navy accounting data did not directly correlate to the degree of full cost required by the Handbook. A standard method for pooling costs and allocating them to Operations Overhead was provided. However, the degree of standardization is limited by the dissimilarities of Naval activities and their functional organizations.

The material and supply costs (expense element T), accumulated in the UMR cost accounts of Operations Overhead cost centers, may be directly used in preparing the full cost estimate. The other cost elements either include composite costs different from those needed (e.g., civilian labor), combine cost elements (e.g., rent and utilities), or cover too broad of a category (e.g., maintenance and repairs). Consequently, source documents other than the UMR accounting documents must be used.



For the purpose of CITA estimates, it is desirable for the Navy to standardize the use of source documents and the allocation methods for all Naval activities, since the accuracy of the source data determines the validity of all subsequent calculations. Standardization will aid estimators and make possible the comparisons of overheads rates among Naval activities, with the possibility of establishing standard overhead rates.

## B. RECOMMENDATIONS AND SUGGESTIONS FOR FURTHER STUDY

### 1. Department of the Navy Action

#### a. Standardize Selection of Source Documents

It is recommended that (1) all CITA in-house Government cost estimates prepared by Naval activities utilize similar source documents for calculating each of the ten cost elements, (2) the Navy's implementation of instructions for CITA should include lists of appropriate source documents.

#### b. Standardize Allocation Procedures

It is recommended that a set process of cost allocation, similar to the process established in this thesis, be implemented Navy-wide.

### 2. Areas of Further Study Needed

It is suggested that the following areas be considered for further study:



a. That the establishment of standard procedures for the development of the other two indirect cost classifications, Material Overhead and G & A expenses, be evaluated.

b. That once a number of overhead rates are established (if by a standard method), a comparison between organizations be made to establish standard overhead rates for all similar Navy activities.

c. That the various methods by which the CITA costs comparisons are being accomplished be evaluated. For example, some activities have contracted with private consulting firms to prepare the entire cost comparison, while others have trained in-house personnel to do the comparison. One approach could be to train cost comparison teams to service several organizations, and yet another tack would be to hire experienced cost accountants.

d. That it be determined if, by using some constant factor, the civilian labor cost reported on the UMR could be converted to an equivalent full cost value, as required by the Handbook.





APPENDIX A  
GLOSSARY OF TERMS

Activities. When used by the Cost Accounting Standards Board, it refers to a subfunction, such as drafting is an activity of the function of engineering. Elsewhere in this thesis the term activity refers to an organizational entity, e.g., a Naval activity is an independent organizational unit.

Allocate. To assign an item of cost or a group of items of cost to one or more cost objectives. This term includes both direct assignment of cost and the reassignment of a share from an indirect cost pool.

Allocation Base. The denominator in the fraction used to develop an overhead rate. It is either the total of some element of expense (or group thereof) or a quantitative measure that is common to all items or activities to which the indirect costs are to be allocated.

Commercial Industrial Type Activity (CITA). A product or service which is required by the Government and that is of a commercial or industrial nature. Examples of commercial and industrial activities are listed in Attachment A of reference 1.

Cost Accounts. Developed to provide a detailed breakdown on where and for what purpose resources are being used. The cost account is the smallest functional division of expense



categories. However, each cost account is also subdivided by expense elements.

Cost Centers. A subdivision of a field activity or responsibility center. An individual cost center is a group of homogeneous service functions, processes, machines, product lines, professional and/or technical skills, etc. It is an organization entity for which identification of costs is desired and which is amenable to cost control through one responsible supervisor. Cost center is herein used synonymously with cost objective, however a Navy-designated cost center may be made of one or more cost objective(s).

Cost Element. A basic unit of cost, such as labor or material. The accumulation of all the basic units related to a given product or service provides the total cost of that product or service.

Cost Objective. A function, organizational subdivision, contract, or other work unit for which cost data are desired and for which provision is made to accumulate and measure the cost of processes, products, jobs, capitalized projects, etc.

Depreciation. The method used to spread the cost of tangible capital assets (plant, machinery, etc.), less residual value, over their estimated useful lives in a systematic and logical manner.

Direct Cost. Any cost which can be identified specifically with a particular final cost objective. Direct costs are not limited to items which are incorporated in the



end product as material or labor. Costs which can be identified specifically with a product/service. All costs identified specifically with other products/services are direct costs of those products/services.

Distribution of Expenses. To charge a proportionate share of minor expenses from one cost center to another cost center or final cost objective. This term is herein used for a process similar to allocation except that an overhead rate is not established, since the distribution is specific and minor in nature.

Expense Elements. Identify the kinds of resources that are being used, such as military personnel, materials and supplies, utilities and rents, etc., similar to the term cost element used in the Handbook.

Final Cost Objective. A cost objective which was allocated to it both direct and indirect costs, and in the cost accumulation system, is one of the final accumulation points.

Full Costs. The total of all direct and indirect costs allocable to a product or service.

Functional Categories and Subfunctional Categories. Divisions of programs developed for the accounting system, to identify the reasons that resources are being consumed, and to represent groupings of operational tasks. There are twelve functional categories.

Indirect Costs. Any cost not directly identified with a single final cost objective, but identified with two or



more final cost objectives or with at least on intermediate cost objective.

Indirect Cost (Overhead) Pool. A grouping of incurred (or projected) costs identified with two or more cost objectives, but not identified specifically with any final cost objective.

In-house. To be within the same organization. Its usage is herein applied to the direct performance of Commerical or Industrial activities by indigenous Government assets.

Navy Industrial Fund (NIF). A consolidated working capital fund for industrial-type and commercial type activities. It provides common services within or among the departments and agencies of DOD.

Operations and Maintenance Navy (O & MN). One of five major congressional appropriation categories, which funds expenses necessary for the operation and maintenance of the Navy. O & MN is herein used as relating to Naval shore activities and the RMS accounting.

Operations Overhead Costs. The indirect costs which are necessarily incurred during a fiscal year to produce or deliver the products or services being provided by a particular element.

Overhead Rate. A percentage, or monetary unit related to a quantitative measure, derived by dividing an indirect cost pool by an allocation base.





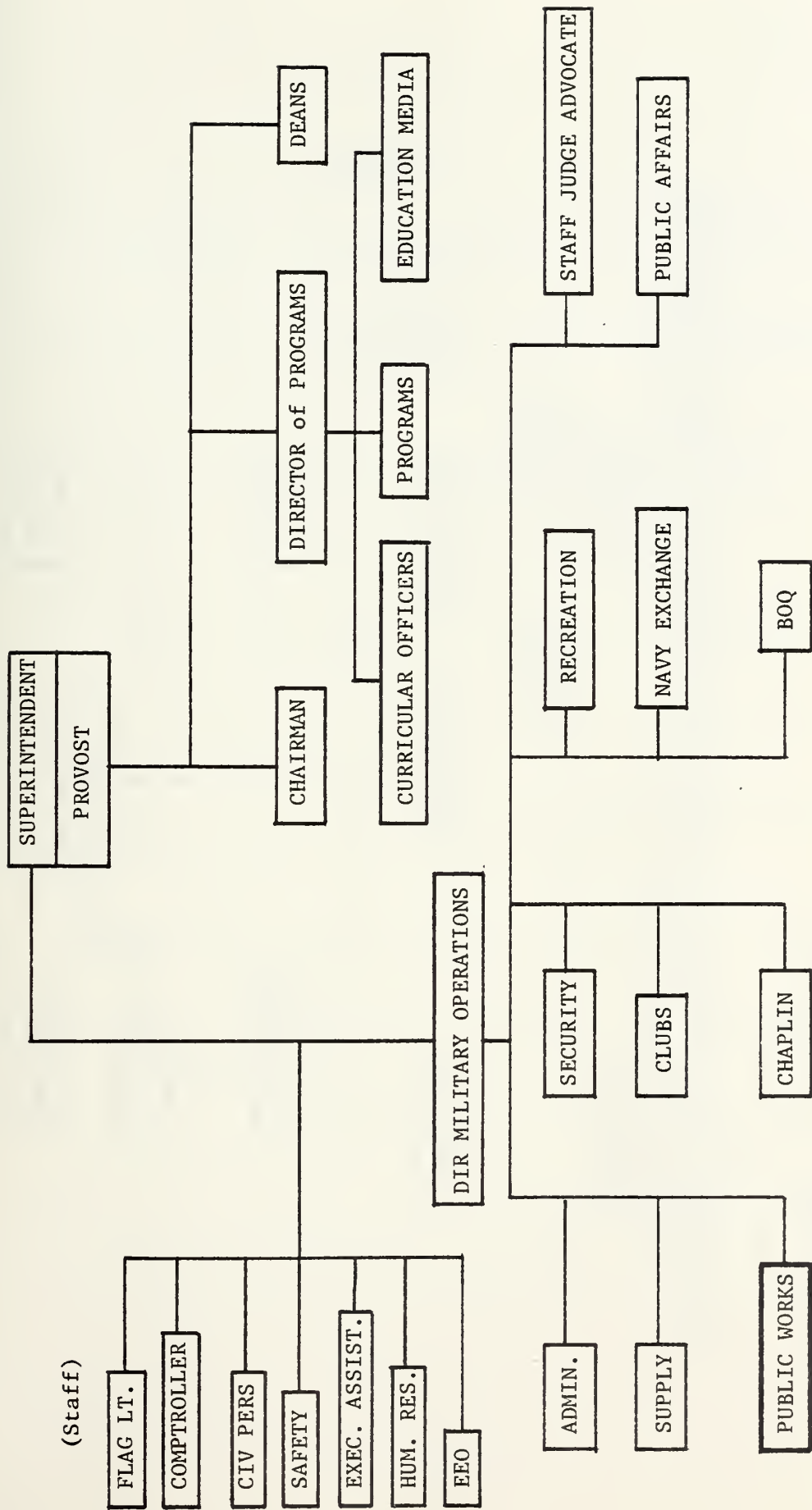
Plant Property. All Navy-owned and Navy-controlled real personal property of a capital nature located in the Naval Shore Establishment.

Producing Department. A cost center which engages in the actual manufacturing of an end product or the final cost objective.

Service Department. A cost center which renders a service which contributes indirectly to the final cost objective. The final cost objective, as herein used, may also provide a service if it is the service which is being estimated.

Work Center. The lowest organizational unit at which costs are accumulated.



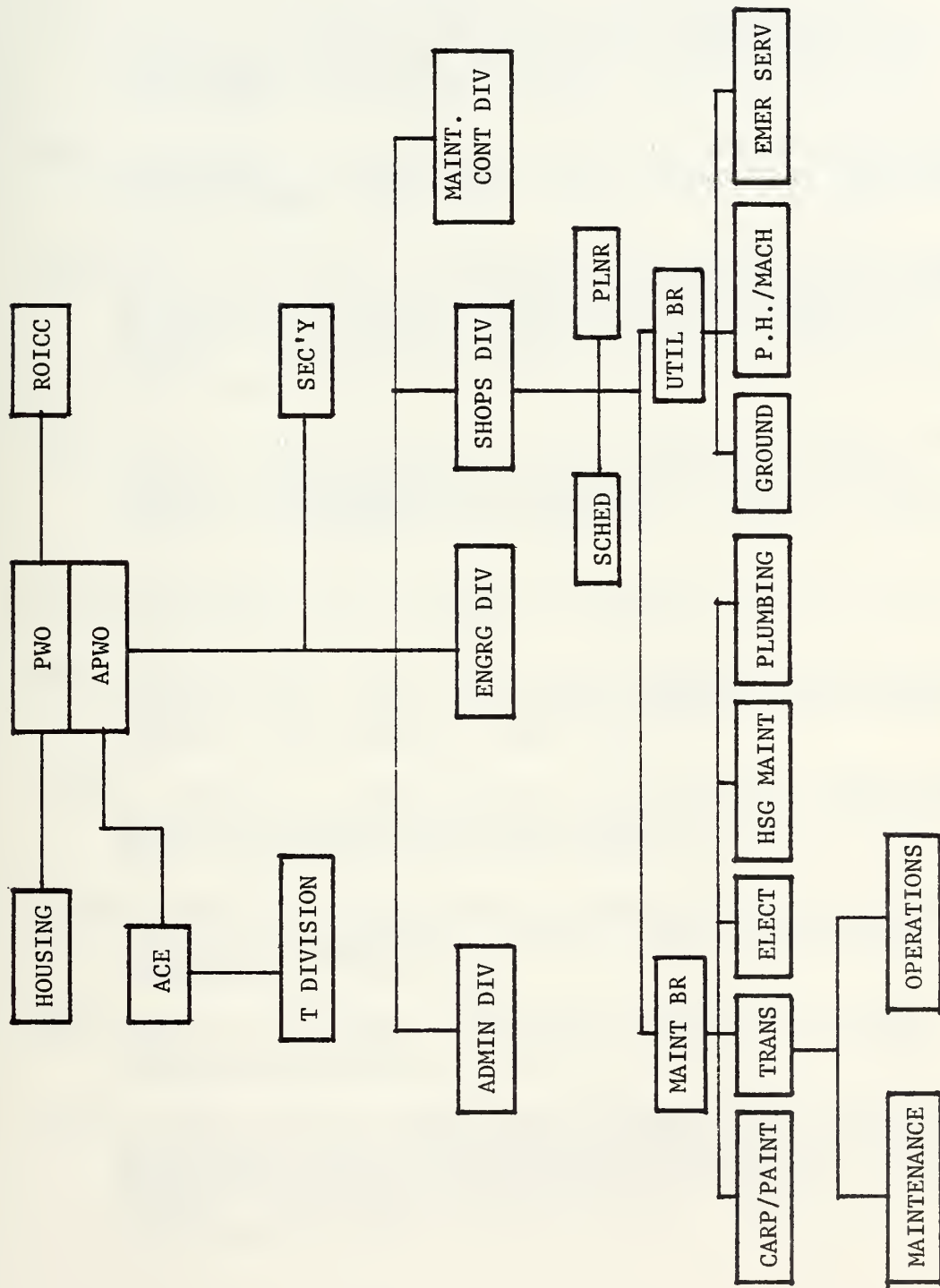


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## APPENDIX B





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